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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/915,886

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Steven J. Burpo

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EXAMINER

FISCHER, JUSTIN R

ART UNIT

PAPER NUMBER

1733

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/915,886

Applicant(s)

BURPO ET AL.

Examiner

Justin R Fischer

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 20031120.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claim 19 is cancelled per Amendment on November 20, 2003

***Claim Rejections - 35 USC § 112***

2. Claims 1-18 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant has amended the claims to require "placing a thin film adhesive against only a surface of said first dry fiber preform". This limitation appears to exclude the use of adhesive material between adjacent fiber plies within a single dry fiber preform. While the specification and figures of the original disclosure support the placement of an adhesive material between the surfaces of the respective dry preforms, there is no support found in the original disclosure to exclude the use of an adhesive material between plies of a given preform. It is emphasized that applicant's positive recitation of an adhesive material between preform surfaces fails to characterize or describe the arrangement of fiber plies within each respective preform (i.e. mere suggestion of adhesive material in one region is not a teaching to exclude adhesive material in a different region). As such, the above noted language constitutes new matter.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tozuka (US 5,981,023, newly cited) and further in view of Brace (US 5,061,542, newly cited) and Flonc (US 5,080,851, of record). As best depicted in Figures 6 and 8, a first and second dry fiber preform formed of a plurality of fiber layers (two 32a's) are attached and subsequently placed within a mold, at which time said mold is evacuated (vacuum), resin is injected into said mold, and a heating/curing treatment is carried out (Column 4, Lines 50-55 and Column 5, Lines 40-67). In describing the attachment of the respective dry fiber preforms, Tozuka suggests they may be joined by stitching. While the reference fails to expressly describe the use of an adhesive material to attach said preforms, one of ordinary skill in the art at the time of the invention would have found the use of an adhesive material to have been obvious since it represents a well known and extensively used attachment technique in the manufacture of preforms and composite structures. For example, Brace is directed to a method of attaching an insert to a dry fiber preform and suggests stitching and adhesive attachment as possible means (Column 4, Lines 25-34)- this suggests that they are recognized as alternatives in the fiber reinforcement industry. Additionally, Flonc suggests the use of a specific adhesive/resin material to attach dry fiber plies prior to resin injection molding, wherein the reference expressly teaches the benefits of such an adhesive material in comparison to previous methods such as stitching (Column 1, Line 10 – Column 2, Line 19). It is emphasized that Tozuka positively describes an attachment means between

the respective dry fiber preforms- one of ordinary skill in the art at the time of the invention would have selected an adhesive material as the particular attachment means for the reasons detailed above. It is well settled that where, as here, two equivalents (adhesive or stitching) are interchangeable for their desired function (to retain the preforms together), an express suggestion of the desirability of substitution of one for the other is not needed to render such substitution obvious. (*In re Fout*, 213 USPQ 532, *In re Siebentritt*, 152 USPQ 618).

In selecting an adhesive material as the specific attachment means, one of ordinary skill in the art at the time of the invention would have adopted a method that was consistent with the teachings of the prior art. In this instance, Flonc teaches an initial heating step in an analogous manner to the claimed invention that allows the adhesive material to penetrate the respective dry fiber layers, after which the bonded assembly is resin transfer molded (Column 2, Lines 13-20 and Column 3, Line 10 – Column 4, Line 15). While Flonc describes the bonding of individual dry fiber plies as opposed to dry fiber preforms formed of a plurality of fiber plies, the attachment method described by Flonc would be equally applicable to the bonding of dry fiber preforms, especially since the mating surfaces of the respective dry fiber preforms being bonded are actually dry fiber plies. Also, the language “thin film adhesive material” does not positively require a self-supporting film but rather defines the ability of a given material to form a thin film adhesive (e.g. upon application or heating).

Regarding claim 2, Flonc teaches heating the mold to the curing temperature in combination with the injection step (Column 4, Lines 11-15). Again, as noted above,

one of ordinary skill in the art at the time of the invention would have adopted a method that was consistent with the teachings of the prior art (Flonc).

As to claim 4, Flonc describes a preferred method using a vacuum bag in which the resin is subsequently heated to melt the adhesive material or resin to bond the dry fiber layers (in the case of Tozuka, the dry fiber preforms would be bonded). In this instance, the vacuum would necessarily contribute to the flow of the adhesive material into the dry fiber preforms. It is further noted that the vacuum and heating can be performed within the same enclosure (e.g. vacuum bag) as is recognized in the composite industry.

With respect to claim 5, the heating temperature would be dependent on the specific adhesive material. One of ordinary skill in the art at the time of the invention would recognize that the adhesive material would have to be heated to a temperature sufficient to melt said adhesive material. As further evidence that one of ordinary skill in the art at the time of the invention would have found the broad range of the claimed invention obvious, the method of Flonc suggests a heating temperature of about 180 degrees Fahrenheit.

Regarding claim 6, Flonc describes the cooling of the thus heated assembly to allow the adhesive or resin material to solidify and firmly hold the preforms together. The language of Flonc ("upon cooling") suggests that the assembly is exposed to room temperature conditions, which are within the broad range of the claimed invention.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tozuka, Brace, and Flonc as applied in claim 1 above and further in view of Setiabudi (US

5,840,238, of record). In describing the resin injection process, neither Tozuka nor Flonc suggest the curing temperature of the composite assembly. It is initially noted that the specific cure temperature is dependent on the type of adhesive/resin used, the desired curing time, and the thickness of the assembly among other factors and as such, one of ordinary skill in the art at the time of the invention would have been able to appropriately select a curing temperature. Additionally, the broad of the range of the claimed invention is consistent with commonly used resin materials in the manufacture of fiber reinforced composites using a resin transfer method. For example, Setiabudi suggests a curing temperature for the injected resin between 40 and 300 degrees Celsius, preferably between 60 and 200 degrees Celsius (Column 2, Lines 5-15). These values are equivalent to between 72 and 512 degrees Fahrenheit, preferably between 140 and 382 degrees Fahrenheit, and encompass the entire range of the claimed invention.

6. Claims 7-11, 15-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tozuka, Brace, and Flonc as applied in claim 1 and further in view of McClure (US 6,555,045, of record). In describing the resin injection process, Tozuka suggests the following steps: evacuating the interior of the mold, filling the interior of the mold with a resin, and carrying out the heating/curing treatment. While Tozuka fails to describe the inclusion of a vacuum to draw the resin through the assembly, vacuum assisted resin transfer molding is extremely well known in the composite industry, as shown for example by McClure, and as such, one of ordinary skill in the art at the time of the invention would have found it obvious to include a vacuum means for this

purpose in Tozuka. In particular, McClure recognizes the benefits of increased and more even wetting due to the use of a vacuum source, which causes the resin to be pulled across the assembly (Column 1, Lines 12-42). Thus, the use of a vacuum to assist the transfer of the resin through the assembly would have been well within the purview of one of ordinary skill in the art at the time of the invention.

As to claims 8, 9, 16, and 17, as noted in the previous paragraph, a heating temperature between 150 and 300 degrees Fahrenheit would have been within the purview of one of ordinary skill in the art at the time of the invention.

With respect to claims 10 and 11, Flonc suggests the solidification of the adhesive/resin "upon cooling" (Column 3, Lines 55-56). The language of Flonc suggests that the assembly is exposed to room temperature conditions, which are within the broad range of the claimed invention.

Regarding claim 15, the combination of references teach all the manufacturing steps and one of ordinary skill in the art at the time of the invention would have recognized that a single vacuum enclosure could have been utilized.

As to claim 20, one of ordinary skill in the art at the time of the invention would have readily appreciated the bonding of the respective preforms and the subsequent RTM within a single apparatus or single manufacturing step. In this instance, the apparatus described by Tozuka is capable of heating adjacent preforms to affect the flow of adhesive prior to injecting resin. The use of a single manufacturing step, as opposed to storing assemblies for later processing, results in an efficient manufacturing process.



7. Claims 12-14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tozuka, Brace, Flonc, and McClure as applied in claim 7 above and further in view of Setiabudi. In describing the resin injection process, neither Tozuka nor Flonc suggest the curing temperature of the composite assembly. It is initially noted that the specific cure temperature is dependent on the type of adhesive/resin used, the desired curing time, and the thickness of the assembly among other factors and as such, one of ordinary skill in the art at the time of the invention would have been able to appropriately select a curing temperature. Additionally, the broad of the range of the claimed invention is consistent with commonly used resin materials in the manufacture of fiber reinforced composites using a resin transfer method. For example, Setiabudi suggests a curing temperature for the injected resin between 40 and 300 degrees Celsius, preferably between 60 and 200 degrees Celsius (Column 2, Lines 5-15). These values are equivalent to between 72 and 512 degrees Fahrenheit, preferably between 140 and 382 degrees Fahrenheit, and encompass the entire range of the claimed invention.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection. Applicant argues that Flonc can only teach the placement of an adhesive material between adjacent dry fiber plies, which themselves define a single dry fiber preform. Furthermore, applicant contends that Flonc and the additional prior art references of record fail to recognize the unobvious advantages obtained by the method of the claimed invention.

Regarding applicant's first argument, a new rejection with Tozuka has been set forth above in light of applicant's amendment that requires each dry fiber preform to be formed of a plurality of fiber layers. In this instance, two independent dry fiber preforms are attached to one another to form a composite laminate structure. While the reference fails to expressly suggest the use of an adhesive material to attach said preforms, the use of an adhesive material to bond respective components is extremely well known in a variety of industries, including the composite industry, as shown for example by Flonc and Brace. Note the substitution of one alternate expedient for another would have been obvious without an express suggestion of the substitution.

As to the alleged "unobvious advantages", Flonc does recognize that improved bonding and stability is obtained due to the migration of the adhesive material through dry fiber layers. In bonding dry fiber preforms, there is a reasonable expectation of success to obtain similar bonding levels, it being emphasized that the contacting surfaces of the respective dry fiber preforms are in fact individual dry fiber layers. One of ordinary skill in the art at the time of the invention would expect the adhesive material to flow through the dry fiber layers of each preform in an analogous manner to that described by Flonc and the claimed invention.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Justin Fischer

February 12, 2004

  
JEFF H. AFTERGUT  
PRIMARY EXAMINER  
GROUP 1300